Evaluating the benefit of licencing military aircraft engineers

Introduction

In 2019 the MAA regulations division conducted a ‘second look’ review into the potential implementation of policy to introduce maintainer licences within the UK defence air environment (DAE) (an outcome of an ‘initial look’ review, undertaken in 2015, committed the MAA to conduct a subsequent review of the decision not to implement).

This would involve incorporating European Military Airworthiness Requirements (EMAR) 66 and 147 into the MAA regulatory publications (MRP). Such policy would see air engineer (AE) technicians trained and licenced to a common European standard.

This article aims to specifically explain EMAR 66 and 147, to consider the benefits and detriments of implementation, how it would impact the MOD and existing training delivery within the UK DAE, and to summarise the rationale behind the review’s outcome.

European aviation policy development

Until the 31 January 2020, the UK was a permanent member state (pMS) of the European Defence Agency (EDA) and was represented by the MAA, at the EDA Military Airworthiness Authorities (MAWA) forum (the post Brexit membership position is yet to be established).

This forum is, in part, responsible for the development of policy on European defence airworthiness, formalised in the EMAR. As such, the MAA has previously opted to implement certain EMAR within the MRP, covering three main areas:

- EMAR 21 – Aircraft certification, design and production
- EMAR M – Continuing airworthiness management organisations
- EMAR 145 – Maintenance organisations

These specific EMAR were assessed to be of clear benefit to the UK DAE due to shortfalls in existing policy and/or anticipated improvements in air safety and reduced risk to life (RtL).

As part of this work, the MAA also agreed to consider the implementation of two further EMAR:

- EMAR 66 – regulation of the training syllabi, approvals and issuance of military aviation maintenance licences (MAML) for AE technicians

- EMAR 147 – regulation and assurance of the maintenance training organisations (MTO) that deliver AE training

Civil aviation regulators around the world universally regulate both maintenance licenses and MTO.

What is an EMAR?

EMAR closely mirror equivalent European Union Aviation Safety Agency (EASA) regulations but are tailored to suit the military environment. EMAR aim to provide a single, high level set of airworthiness requirements that can be implemented by all EDA pMS to harmonise military airworthiness activity and collectively create and maintain a uniform regulatory environment, however national implementation of EMAR is optional.

As implementation is optional and interpreted differently by each pMS, the resulting regulatory environment may not be as uniform as originally envisaged. However, significant benefit has been derived from 5-eyes nations and EMAR nations agreeing in 2014 to mutually recognise each other in the EMAR 21 competence area, and the UK is using this to accept US Navy and US Army certification data for the Poseidon P8 and Apache E model respectively.

Theoretically, for EMAR 66 and 147, implementation would enable opportunities for enhanced aircraft interoperability, servicing and maintenance between pMS.

As a comparative example, a car, built and maintained to agreed European standards, can be taken to any main dealership in Europe for repair or service. Due to uniform regulation across the European car industry, the work should be undertaken to a minimum agreed standard by equivalently trained and qualified mechanics.

The 2015 review

The initial MAA review of EMAR 66 and 147, carried out in 2015, opted not to implement the policy based on several factors, the most pertinent being:

- there was insufficient evidence to suggest that a reduction in RtL or improvement in Air Safety would be achieved

- extant arrangements for technical training on UK military aircraft delivered a high-quality product, which was considered fit for purpose and suitably controlled within the DAE

- there was no clear efficiency advantage to the MOD identified

- implementation did not align to the MAA’s continuing aim to produce only regulation that is targeted and proportionate, whilst minimising burden across the regulated community (RC)

However, the review did commit the MAA to the conduct of a follow up review of this decision. Hence, the ‘second look’ review was undertaken in 2019.

Scale of the implementation task

As part of the potential implementation work, investigations revealed that the MAA would be required to assess and approve approximately 60 MTOs and issue up to 17,500 MAMLs.

Based upon this information and feedback from other pMS that had already implemented, or were implementing, these EMAR, it was assessed that the UK’s task would constitute a medium scale change programme of up to 10 years duration. The internal MAA resource bill for this change programme is acknowledged to be significant.

Stakeholder engagement

An essential part of the review work involved early and continued engagement with key stakeholders across the RC.

These included all senior duty holders and group chief air engineers, industry senior representatives engaged via the Aerospace, Defence, Security and Space (ADS) group, the Defence College of Technical Training (DCTT), the Civil Aviation Authority (CAA) and those EDA pMS that had already implemented these specific EMARs.

These two way communications were critical in establishing and understanding the potential benefit realisation that implementation would deliver to the UK DAE and to the MOD as a whole.

Analysis of air safety data

One of the main factors in any decision to implement new or amend existing regulation is that there should be real potential for improved air safety and reduced RtL. To assess this, a comprehensive review of available MOD and civil air safety data was carried out.

It should be noted that, within the DAE, all incidents and accidents that could have an impact on air safety are primarily reported and recorded on the Air Safety Information Management System (ASIMS) using a defence air safety occurrence report (DASOR) form. The primary civil equivalent is the mandatory occurrence report (MOR).

Review and analysis of ASIMS data was conducted covering the period October 2014 to February 2019 (October 2014 was the end date of last ASIMS review). In addition, a review of all Defence Air Investigation Branch (DAIB) reports

and associated recommendations was carried out for the period 2010 to 2018.

Of the DASORs raised during the period, detailed scrutiny, based upon DASOR narratives and professional judgement, identified only 1.1% in which the outcomes might have been positively affected had technicians involved been trained to EMAR 66 standards.

DAIB reports from aircraft accidents highlighted that only 0.16% of associated recommendations would have been positively affected by EMAR 66 implementation. No trends in training delivery shortfalls were identified from either data set.

A review of civil sector open source data was also carried out which included International Air Transport Association (IATA) global safety reports and CAA periodic incident analysis reports (which include MOR and confidential human incident reporting programme data).

The only reported training shortfalls were detailed in the IATA report which cited that 2% of non-fatal accidents were attributed to latent conditions related to deficiencies in maintenance operations training systems.

There was mixed feedback from the RC. In terms of EMAR 66, the quantifiable benefits of implementation remained unclear when set against RtL, safety, operational capability and front line command financial impact. This prompted negative feedback from the military RC, despite wide acknowledgement that opportunities existed under EMAR 66 to align future training delivery across single service commands.

Concerns were also raised over the highly prescriptive and mandatory structure of the part 66 basic course (that is the AE foundation training course). It departs significantly from that of the existing, flexible, single service, phase 2 training and phase 3 career course requirements and content. This results in increases to training course length and potential impacts to trade and rank structures.

Feedback regarding EMAR 147 compliance was less resistant in terms of MTO infrastructure, staff and process requirements, as the training schools are already largely compliant. However, concerns were highlighted over:

- anticipated funding increases required to enact such change
- the differences required in approach toward exam structure
- assessment strategies and remedial training
- perceived negative effects on any single service type streaming or ‘fast track’ programmes

The industry view was more strongly in favour of implementation, based upon:

- opportunities to align assurance of maintenance personnel training, competency assessment and continuation training

- enhanced interchangeability of licensed workforces

- full exploitation of interoperability, servicing and maintenance contracts with MOD and EDA pMS

It was acknowledged that further engagement would be required with smaller organisations. Ensuring that the financial implications of transferring to a future licensed workforce would not negatively impact their ability and/or appetite to support and compete for existing and future MOD support contracts.

This could result in an erosion in the breadth of competition at future contract initiation or renewal and could adversely affect the MOD.

Other EDA pMS implementations

To date, only 9 of the 27 MAWA pMS have implemented, or are in process of implementing, EMAR 66 and 147. Varying levels of maturity and application have been achieved, with France and Italy having conducted the largest implementation programmes based on the number of MAMLs issued.

The overall lack in current maturity of existing pMS implementation programmes makes it difficult to quantify accurately the tangible medium to long term benefits (and emergent issues) including those associated with RtL and air safety impact assessments. Should a decision be made for the UK to implement these EMAR, a comprehensive assessment and recognition exercise would need to be conducted for each pMS on a case by case basis.

EMAR development

Previous MAA attendance at each of the MAWA forum, the continuing airworthiness advisory group (CAWAG) and the European aviation maintenance training committee (EAMTC), helped confirm the wide acknowledgement that EMAR 66 is the suitable vehicle and benchmark for aviation technician training. However, in its current form, the consensus is that some elements are too rigid and outdated.

The last update to EMAR 66 was completed in 2014. The next edition is not expected to be published before the end of 2023 due to EDA resource constraints and lack of task prioritisation.

Sustained pressure is being applied by the international RC to have EMAR 66 and its associated training syllabi updated sooner to incorporate new learning technologies and competency based training to facilitate a more flexible approach to training delivery.

These changes would align more favourably with existing UK defence training policy, teaching methodologies and flexible training requirements.

Single service initiatives

As part of a wider programme seeking to update and enhance technicians in the Royal Electrical and Mechanical Engineers (REME) through career training. The Army Chief Air Engineer is currently engaged with the CAA to explore opportunities for CAA accreditation of elements of technician training.

Whilst there is no current or future intent to issue any form of licence to REME technicians, there is an aspiration for technicians to be able to accrue examination credits towards a civil part 66 licence (similar to an EMAR 66 MAML) as they progress through their military careers, gaining valuable in-service experience.

If successful, this initiative would prove recruitment and retention positive by investing in the long term benefits of personnel. Although still in its early stages, this programme has much potential and the MAA will continue to monitor progress in support of this activity.

Air Command have also recently instigated a separate review into future licensing of aviation technicians. This review is still in its early stages and has not yet concluded.

Outcome of the MAA review

The EMAR 66 and 147 implementation review covered multiple work strands and engaged with multiple stakeholders. It concluded that the overall level of EMAR 66 and 147 development within implementing pMS is still maturing, with only one third of states having implemented, or being in process of implementing, these EMAR.

The analysis of UK defence and global air safety data confirmed that there is no tangible evidence to support a significant reduction in RtL or improvement in air safety as a result of implementing EMAR 66 and 147.

When coupled with the largely negative feedback received from the military RC, specifically regarding EMAR 66 and its potential impact upon existing training and rank structures and the lack of its structural flexibility, the decision was taken not to implement these EMAR at this time.

Furthermore, it was decided that subsequent reviews would only be considered when:

- an increase in RtL or reduction in air safety is identified by the MAA or single service that would be suitably addressed by EMAR implementation
- there is consolidated and unified tri-service appetite for

implementation, supported by suitable cost benefit analysis to demonstrate clear benefit to the MOD

- there are significant and/or favourable changes to EMAR that either better align them to the existing UK approach to training and/or they provide more modern and flexible options for the scope and delivery of future technician training

- the UK government policy on the future structure of civil aviation regulation is decided and this is contingent upon the outcome of ongoing UK government negotiations with the EU

What next?

Several actions were identified relating to the investigations and analysis carried out as part of this review. Whilst considering these, the MAA will:

- continue to proactively monitor aviation maintenance training regulation, developments, issues and enhancement opportunities

- implement a periodic review of civil aviation air safety data to provide a more holistic understanding of global continuing airworthiness trends in maintenance errors, to enable comparison with DAE ASIMS trends, and further enhance DAE air safety analysis and assurance activity

- monitor command initiatives for CAA recognition and accreditation of service technician training to safeguard continued compliance with existing and future regulation, nurture a consistent and coherent approach with the CAA and ensure opportunities for regulatory enhancements are readily identified and acted upon

The conduct and outcomes of this review are part of the MAA’s commitment to engaging with the RC to ensure that the wider impacts of any new regulation are considered as far as practicable.

In turn, this meets the MAA’s commitment to ensure that, in all cases, any new regulation is targeted and proportionate to minimise the bureaucratic burden imposed upon the RC, whilst delivering tangible improvements to air safety and reductions in RtL.